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ROYAL BOTANIC GARDENS, KEW.

BULLETIN

OF

MISCELLANEOUS INFORMATION.

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XXXV.—ON A COLLECTION OF FUNGI FROM AUSTRALIA AND NEW ZEALAND.

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(WITH PLATES.)

Cooke's "Handbook of Australian Fungi," published in 1892, together with McAlpine's "Systematic List" of 1895, summarised all that was known at that time with regard to Australian fungi. Since then McAlpine has published much critical work on the Uredineae and lower fungi, especially such as are parasitic, and in other groups scattered additions to the list have been recorded. For Queensland only, a useful enumeration of the species known is given in Bailey's "Comprehensive Catalogue of Queensland Plants" (1909–1913). Apart from such additions, however, very little has been done with regard to the Basidiomycetes since the publication of the two general works mentioned, and the same remarks apply in even greater degree to the fungi of New Zealand, the higher forms of which, as far as known, were brought together in Massee's two papers on the Fungus Flora of New Zealand (Trans. New Zeal. Inst. 1898, 1907). In the case of many species, therefore, it is desirable that previous records should be confirmed or corrected in the light of more recent work. The working out of a collection made by Mr. W. N. Cheesman, of Selby, during the visit of the British Association to Australia in 1914, and presented by him to Kew, has afforded an opportunity of increasing our knowledge as to some species, and also of adding several new records to the already long list of fungi known from the region, while at the same time reducing others to synonymy. Mr. Cheesman succeeded in getting together a considerable collection in the time at his disposal, especially of *Polyporaceae* and *Thelephoraceae*, to which families particular attention was paid. Abundant material was sent of each species, and in addition to those named several others occurred, chiefly species of *Poria*, which at present it has not been possible to name satisfactorily. In the following list both common and less-known species are enumerated, but synonyms are not

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given in the case of those well-known species which have been fully worked out by other authors. In some cases references are given to authors quoting lists of synonyms.

The Mycetozoa collected by Mr. Cheesman form the subject of a separate paper by Miss G. Lister and Mr. Cheesman, published in the Journal of Botany, vol. liii, July, 1915, pp. 203–212.

With regard to the general character of the flora, and the conditions at the time of collecting, Mr. Cheesman kindly contributes the following notes, in which it will be noted that several species are mentioned which are not included in the following list, owing to their not having been preserved.

"The period of dry weather which had existed previous to the visit (August and September) militated against the *Agaricaceae*, but this was compensated for by the profusion of Polypores, which are much more resistant to drought and not so subject to decay. The brilliant red *Trametes cinnabarina* and *Polystictus hirsutus* were everywhere on dead wood, and as plentiful as are *P. versicolor* and *Stereum hirsutum* in Britain. *Schizophyllum commune* was also ubiquitous, but always as a saprophyte. Some observers have noted it as a parasite on sugar-cane, and search was made for it in this rôle, but without success. During the visit to the sugar-cane fields in Queensland it occurred frequently on old, dead and decaying canes, but not on living ones, and the planters stated they had never seen it on living cane.

"Near dwellings, several species of *Coprinus* were seen, notably *C. comatus*, *C. atramentarius*, and *C. plicatilis*, and it was reported that in the moist season the common mushroom grew plentifully in pastures in all the States. In moist gullies Collybias and Mycenas were occasionally seen, but their frail nature did not permit of collection and preservation.

"*Armillaria mellea* was growing on the roots of peaches in the orchards on Mt. Lofty, near Adelaide, and also on the roots of wattles in cleared places in the bush in South Australia, Victoria, and New South Wales, but the small amount of humus in the soil of the bush, due to the work of the various species of ants, would tell against a profusion of terrestrial fungi even in the wet season.

"Forest trees did not appear to suffer very much from the attacks of destructive fungi. In planted pine forests, both in Australia and New Zealand, *Dasyscypha calycina* was well established, and here *Lenzites sepiaria* was found, but was not seen attacking any native trees.

"Other fungi which may be mentioned are *Tremellodon gelatinosum*, which occurred at Moruya, New South Wales, and *Polyporus Mylittae*, a large fresh specimen of which, having a sclerotium nearly a foot in diameter, and several sporophores attached, was shown at Melbourne in the lecture room of the Botanical Section. *Aseroë rubra* was described as occurring frequently about Brisbane in the rainy season."

In the following paper the geographical distribution of the species enumerated is indicated, as far as it has been possible to ascertain it with any degree of certainty, but there is no doubt

that the range of many will be considerably widened with increasing knowledge of the floras of different regions. With regard to the general character of the Australasian fungus flora, however, the present list confirms the temperate type indicated by previous records. Of the 100 species named, 48, or nearly half, occur in Europe or North America, or both, excluding *Irpex flavus*, which, although originally from North America, is typically a tropical species. Of these 48, 12 only are cosmopolitan, the others being for the most part only known from the temperate regions. Of the remaining species, 28 (a large proportion) are, as far as known at present, endemic to the continent of Australasia, including the seven new species, but it is noteworthy that five of these seven species show strong affinities with known species of Europe or North America. The remainder of the list is made up of tropical species, cosmopolitan or common to the tropics of the East and Africa. Two only, *Xylaria apiculata* and *Hymenochaete fuliginosa*, are up to the present recorded only from Tropical America and Temperate South America, but are probably more widely spread. The analysis of the list is as follows—

Common to Europe or North America (12 cosmopolitan)	48
Common to Tropics of East and Africa	16
Cosmopolitan in the Tropics (excluding the 12 common to temperate regions)	6
Common to American Tropics	2
Endemic	28
	100

AGARICACEAE.

Lentinus fasciatus, *Berk.* in Hook. Journ. Bot. 1840, p. 146.
New South Wales. Moruya.
Distrib. Australia, Tasmania.

Panus stipticus, *Fr.* Epicr. p. 399.
South Australia. Mt. Lofty, Adelaide.
Distrib. Europe, North America, Brazil.

Lenzites sepiaria, *Fr.* Epicr. p. 407.
New South Wales. Moruya.
South Australia. National Park, Adelaide.
Distrib. North Temperate Zone.

L. striata, *Fr.* Epicr. p. 406.
South Australia. Angaston.
Distrib. China, India, Malaya, Tropical Africa (Hennings), Tropical America.

L. repanda, *Fr.* Epicr. p. 404.
South Australia. Mt. Lofty, Adelaide.
Distrib. Cosmopolitan in tropical regions.

Schizophyllum commune, *Fr.* Syst. Myc. i. p. 333.
Common everywhere.
Distrib. Cosmopolitan.

POLYPORACEAE.

Polyporus arcularius, *Fr.* Syst. Myc. i. p. 342.
South Australia. Mt. Lofty, Adelaide.
New Zealand. Mamaku, near Rotorua.
Distrib. Cosmopolitan.

P. gilvus, *Fr.* Elench. p. 104.
New South Wales. Moruya.
South Australia. National Park, Adelaide.
Distrib. Cosmopolitan.

Fomes hemitephrus (*Berk.*) *Cooke* in Grevillea, xiv. 1885, p. 21.
New South Wales. Moruya and Blue Mountains.
Queensland. Brisbane.
Distrib. New Zealand.
This species is well marked by the tawny orange colour of the flesh immediately beneath the cuticle, which was noted by Berkeley, although it is not so evident in the fragmentary type specimen as in young and recent collections. Lloyd's record of *Fomes martius*, from Australia, apparently refers to this plant.

F. robustus, *Karst.* Krit. Ofvers. Finl. Basidsv. 1889, p. 467.
New South Wales. Moruya.
Distrib. Europe, Japan, Hawaii (Lloyd), Tropical Africa (Herb. Kew), Western United States (Lloyd).
Setae rare, ventricose, 17–20 × 10–11 μ. Spores hyaline, subglobose, 7·5–8 μ diam. Previously recorded from New South Wales by Lloyd (Letter 38), as growing on *Eucalyptus*, and also on *Hakea* sp. (Letter 50).

Ganoderma applanatum (*Pers.*) *Pat.* in Bull. Soc. Myc. Fr. 1889, p. 67.
Common in Australia and New Zealand.
Distrib. Cosmopolitan.

Polystictus xanthopus, *Fr.* Nov. Symb. p. 74.
New South Wales. National Park, Sydney.
Distrib. Tropics of Old World.

P. conchifer (*Schw.*) *Cooke* in Grevillea, xiv. 1886. p. 79.
New Zealand. Rotorua. On bark at the edge of a pine plantation.
Distrib. North America.

P. pergamenus, *Fr.* Nov. Symb. p. 85.
South Australia. Botanical Gardens, Adelaide.
Victoria. Ballarat.
Distrib. Philippines. North and South America, Mexico.

P. lilacino-gilvus (*Berk.*) *Cooke* in Grevillea, xiv. 1886, p. 82.
Queensland. Enoggera, near Brisbane.
Distrib. Tasmania, New Zealand.

P. floccosus (*Jungh.*) *Fr.* Nov. Symb. p. 79.
Trametes acuta, Cooke in Grevillea, x. p. 132.
New South Wales. Moruya.
Distrib. Malaya.

P. versicolor, *Fr.* Nov. Symb. p. 86.
Western Australia. Zoological Gardens, Perth.
South Australia. Mt. Lofty, Adelaide.
New Zealand. Near Lake Takapuna, Auckland.
Distrib. Cosmopolitan.

P. hirsutus, *Fr.* Nov. Symb. p. 86.
Common everywhere.
Distrib. Cosmopolitan.

P. Peradeniae (*Berk. et Br.*) *Cooke* in Grevillea, xiv. 1886, p. 84.
Victoria. Creswick, near Ballarat.
Queensland. Nambour, Blackall Range.
Distrib. India, Ceylon, Malaya, Brazil.
Both specimens on burnt wood. Spores cylindrical, curved, 7–9 × 2·5–4 μ. Cystidia encrusted with crystals, cylindrical or slightly fusiform, blunt at the apex, 20–35 × 5–9 μ.

P. luteo-olivaceus (*Berk. et Br.*) *Cooke* in Grevillea, xiv. 1886, p. 86.
New Zealand. Mamaku, near Rotorua.
Distrib. India, Malaya, Tropical Africa.
These specimens are unusually robust, with thick, swollen, sterile margins. Spores hyaline, cylindric-ellipsoid, straight or slightly curved, 9–10 × 2·5–3·5 μ.

P. tabacinus (*Mont.*) *Fr.* Nov. Symb. p. 93.
South Australia. National Park, Adelaide.
Distrib. Tropics of Old World.

P. cichoriaceus (*Berk.*) *Fr.* Nov. Symb. p. 92.
New South Wales. Moruya.
Distrib. India, Malaya, Polynesia.

Poria vaporaria (*Pers.*) *Cooke* in Grevillea, xiv. 1886, p. 111.
New South Wales. Moruya.
Distrib. Europe, North America, South America, Tasmania, New Zealand.

P. hyposclera, *Berk.* in Cooke, Grevillea x. p. 103.
New South Wales. Katoomba, Blue Mountains.
Distrib. Tahiti, New Caledonia.

P. eupora, *Karst.* in Not. Flor. Faun. Fenn. ix. 1868, p. 360.
New South Wales. Moruya.
Distrib. Europe.

P. hymenocystis (*Berk. et Br.*) *Cooke* in Grevillea, xiv. 1886, p. 112. *Polyporus hymenocystis,* Berk. et Br. Ann. Nat. Hist. Ser. v., vol. iii. 1879, p. 210.
New South Wales. Moruya.
Distrib. Europe.

Trametes cinnabarina, *Fr.* Hym. Eur. p. 583.
Common everywhere.
Distrib. Cosmopolitan.

T. cingulata, *Berk.* in Hook. Journ. Bot. vi. 1854, p. 164.
Victoria. State Nursery, Creswick, near Ballarat.
Distrib. India, Malaya, Tropical Africa, South Africa, Madagascar.

T. ochroleuca (*Berk.*) *Cooke,* Handbook of Australian Fungi, p. 158.
Queensland. Nambour, Blackall Range.
Distrib. Japan, Ceylon, Philippines.

T. lactinea, *Berk.* in Ann. Nat. Hist. x. 1842, p. 373.
New South Wales. Katoomba, Blue Mountains.
Distrib. India, Ceylon, Philippines (form).

T. epitephra, *Berk.* in Journ. Linn. Soc. xiii, 1873, p. 165.
Victoria. Ballarat.
New South Wales. Moruya.
Distrib. New Zealand.

T. Carteri, *Berk.* in Sacc. Syll. ix, p. 196.
South Australia. National Park, Adelaide.
Distrib. India.
Very close to the *Polystictus floccosus,* Jungh., but differing especially in the pale grey pileus and pores.

T. decipiens (*Berk.*) *Bres.* MS. in Herb. Kew.
Hexagonia decipiens, Berk. in Journ. Linn. Soc. xiii. 1873, p. 166.
New South Wales. Moruya.
Distrib. Only known from Australia.
Well marked by the large, elliptical, brown spores, 15–20 × 7·5–9 μ.

Daedalea quercina, *Pers.* Syn. p. 500.
South Australia. Botanic Gardens, Adelaide. On oak stump.
Distrib. Europe, Madagascar, North America.

D. confragosa, *Pers.* Syn. p. 501.
New Zealand. Rotorua. On trunk of willow.
Distrib. Europe, Philippines, North America.

Favolus Rhipidium (*Berk.*) *Sacc.* Syll. vi. p. 397.
New Zealand. Mamaku, near Rotorua.
Distrib. Japan, Bonin Islands, Ceylon, Malaya, North America, South America.

Gloeoporus dichrous (*Fr.*) *Bres.* in Hedwigia, liii. p. 74.
Polyporus dichrous, Fr. Obs. i. p. 125.
New South Wales. Moruya.
Queensland. Enoggera, and Nambour, Blackall Range.
New Zealand. Mamaku, near Rotorua.
Distrib. Europe, Japan, Bonin Islands, Philippines, Tropical Africa, Madagascar, South Africa, North America, West Indies, South America.

Merulius Corium, *Fr.* Elench, p. 58.
South Australia. Adelaide.
Distrib. Europe, India, Malaya, Tasmania, South Africa, North America, South America.

Irpex brevis, *Berk.* in Hook. Flor. Nov. Zel. ii. p. 181.
Victoria. Botanic Gardens, Melbourne.
Distrib. New Zealand.
The species is very near to *I. zonatus,* Berk. et Br., but is distinguished by the thicker pilei, which are usually imbricated; and by the coarser spines. Spores hyaline, elliptical, 4–5 × 3 μ.

I. flavus, *Kl.* in Linnaea, viii. 1833, p. 488.
South Australia. Mt. Lofty, Adelaide.
Distrib. India, Malaya, Polynesia, Tropical Africa, North America.

I. fusco-violaceus, *Fr.* Elench. i. p. 144.
New South Wales. Moruya.
Distrib. Europe, North America.

I. calcareus (*Cooke et Mass.*) *Wakefield,* comb. nov.
Hydnum calcareum, Cooke et Mass. in Grevillea, xxi. p. 38.
New South Wales. Katoomba, Blue Mountains.
Distrib. Recorded only from Victoria.
Resupinate, rather thick, dirty white or lilac, with a chalky appearance. Spines very crowded, cylindrical, blunt, more or less united at the base, very brittle, and frequently with the apices broken off. Tissue chalk-white. Spores hyaline, broadly elliptical, 4–5·5 × 3–4 μ. Inter-mixed with the basidia are occasional, slightly projecting, smooth cystidia or paraphyses, cylindrical or slightly fusiform, 20–55 × 7–9 μ, blunt at the apex. Hyphae pale, 2–4 μ in diameter.

Odontia scopinella (*Berk.*) *Cooke,* MS. in Herb. Kew.
Hydnum scopinellum, Berk. in Hook. Flor. Nov. Zeland. ii. p. 181. New South Wales. Moruya.
Distrib. New Zealand.
Spores hyaline, cylindrical, slightly curved, usually with two oil-drops, 5–7 × 1·5 μ. Hyphae thick-walled, with clamp-connections at the septa, 3–4 μ in diameter.

Grandinia helvetica, *Fr.* Hym. Eur. p. 627.
Queensland. Nambour, Blackall Range.
Distrib. Europe.

G. australis, *Berk.* in Hook. Flor. Tasm. ii. p. 257.
Hydnum pexatum, Mass. in Kew Bull. 1901, p. 157.
New South Wales. National Park, Sydney.
Distrib. Tasmania.
Cinnamon-coloured, the granules varying much in development. The subiculum is cracked when dry, somewhat flocculose, and cinnamon throughout, not white as stated in the original description. The appearance of whiteness in the cracks of the type specimen is due to a deposit of crystals of mineral matter, of uncertain origin. Spores hyaline, elliptical, 5–6 × 3–4 μ.

Phlebia reflexa, *Berk.* in Hook. Journ. Bot. 1851, p. 168.
For synonymy, see Lloyd, Letter 46, pp. 6–7.
New South Wales. Moruya.
Distrib. Japan, India, Malaya, New Zealand, Tropical Africa, Madagascar, North America.

Hymenochaete attenuata, *Lév.* in Ann. sci. nat. sér. 3, v. 1846, p. 152.

New South Wales. Moruya.

Distrib. Japan, Malaya.

Distinguished by its small size, thin flexible pilei, and from *H. rheicolor* by the darker colour of both surfaces. It has also been received at Kew from Mr. F. M. Bailey, of Queensland.

H. villosa (*Lév.*) *Bres.* in Hedwigia, li. 1912, p. 323.

H. strigosa, Berk. et Br. in Journ. Linn. Soc. xiv. 1873, p. 68; *H. spadicea,* Berk. et Br. loc. cit., p. 68. *H. phaea,* Berk. in Cooke, Grevillea, viii. 1880, p. 146.

New South Wales. Moruya.

Distrib. India, Ceylon, Malaya, New Zealand.

Readily distinguished by the dark colour, minutely velvety hymenium, and short spines.

H. tabacina, *Lév.* loc. cit. 1846, p. 152.

New Zealand. Mamaku, near Rotorua. Resupinate specimens only.

Distrib. Europe, North America.

H. tasmanica, *Mass.* in Journ. Linn. Soc. xxvii. 1890, p. 105.

South Australia. National Park, Adelaide.

Distrib. Tasmania. The locality "New Zealand," cited in the original description, is evidently a slip.

A very distinct species, well marked by the habit, and by the possession of rather rigid, more or less dendroid, branched brown hyphae, intermixed with the long pointed spines in the hymenium. The latter follows the inequalities of the matrix and is itself irregularly tuberculose, and minutely velvety under the lens. The whole plant is rather thick and is dark ruddy brown in colour.

H. fuliginosa, *Lév.* loc cit. 1846, p. 152, *sensu Berk.* in Cuban Fungi, Journ. Linn. Soc. x. 1869, p. 335.

New South Wales. Moruya.

Distrib. Cuba, Jamaica, Venezuela, Juan Fernandez.

Resupinate, or with reflexed margin, rather thick, soft in texture, hymenium cracked when old and dry. Hymenium of a peculiar dusky, drab-brown tint, matching Ridgway's "Natal Brown" when in good condition, but becoming more greyish when old. The dark colour of the hymenium is sharply contrasted with the bright, tawny, sterile margin, and the plant is well marked by this character and by its soft, velvety appearance.

The distribution of the species given above is from specimens in the Kew Herbarium verified by the author, but the plant probably occurs throughout the tropics. According to Bresadola (Ann. Myc. 1903, p. 93), it is not the same species as H. *fuliginosa* (Pers.) Bres.

Stereum Schomburgkii, *Berk.* in Journ. Linn. Soc. xiii, 1873, p. 168.

Hymenochaete olivacea, Cooke in Grevillea, xiv. 1885, p. 11.

New South Wales. Nowra.

Distrib. Tropical Africa (*Kew Bull.* 1914, p. 259).

S. umbrinum, *Berk. et Curt.* in Grevillea, i. 1873, p. 164.

Hymenochaete umbrina, B. et C. in Cooke, Grev. viii. 1880, p. 148.

H. vinosa, (Berk.) Cooke in Grev. viii. 1880, p. 149.

H. purpurea, Cooke et Morg. in Journ. Cinc. Nat. Hist. Soc. 1888, p. 198.

H. scabriseta, Cooke in Rav. Fung. Amer. n. 717, 1882.

H. Kalchbrenneri, Mass. in Journ. Linn. Soc. xxvii. 1890, p. 116.

Peniophora intermedia, Mass. in Journ. Linn. Soc. xxv. 1889, p. 143.

Queensland. Brisbane.

Distrib. Poland (Bresadola), Tropical Africa, North America, Central America.

Apparently the species is common in Australia, abundant material having been collected. The Australian specimens received have all been in the purple stage, which was named *H. purpurea.* The author is indebted to Professor E. A. Burt, of the Missouri Botanical Garden, for information as to the great variability of this species as it grows in America, and for the synonymy of the American species cited above.

S. hirsutum, *Fr.* Epicr. p. 549.

New Zealand. Domain Park, Auckland. Abundant specimens.

Distrib. Cosmopolitan.

In the Australasian specimens the pileus and hymenium are usually very bright yellow, more brilliant than in the common European form.

S. vallereum, *Berk.* in Hook. Flor. Nov. Zel. ii. p. 183.

New Zealand. Mamaku and Wairoa, near Rotorua.

Distrib. Japan, Australia, Madagascar, South Africa.

S. Leichkardtianum, *Lév.* (?) in Ann. sci. nat. sér. 3, v. 1846, p. 148.

Victoria. Botanic Gardens, Melbourne.

Distrib. Only known from the type, described from Australia.

The present species is a large and striking form, referred doubtfully to Léveillé's species from the description only. Sporophores rather large, frequently laterally confluent, 2·5–4·5 cm. long, and more or less decurrent behind. Pileus alutaceous to pale brown, zoned, softly velvety-tomentose, or sometimes almost spongy above, margin somewhat wavy or lobed.

Hymenium smooth, pale yellow to buff when dry, bright cadmium yellow when moistened. No cystidia present. Spores hyaline, elliptical, 7–9 × 3–3·5 μ. Hyphae yellowish, rather thick-walled, 2–5 μ in diameter.

S. ceriferum, *Wakefield,* sp. nov.

Pileus 4–8 cm. latus, 2–3 cm. longus, sessilis, postice decurrens interdum omnino resupinatus, umbrinus, concentrice sulcatus et paucis zonis obscurioribus ornatus, adpresse spongioso-tomentosus. *Trama* tenuis, rigida, umbrina. *Hymenium* nigrum, pruina albida velatum, ut caesio-glaucum videtur. *Cystidia* nulla; *basidia* hyalina; *sporae* non visae. *Hyphae* subhymeniales brunneae, tenuiter tunicatae, flaccidae, septatae, saepe ad septa nodosae, 3–5 μ crassae.

Hab. On decaying wood, Rotorua, New Zealand.

A beautiful species, of striking appearance on account of the pruinose hymenium, which appears bluish-grey in colour and contrasts sharply with the umber-brown pileus. The bloom on the hymenium appears to be due to a deposit of a waxy nature, which dissolves on the addition of potassium hydrate solution. The appearance of the upper surface of the pileus resembles that of *S. prolificans,* Berk. (= *S. vespilloneum,* Berk.); but the hymenium differs in colour, having no tint of brown, and in the absence of cystidia. The dark-brown basal hyphae, with clamp connections, are also distinctive.

S. illudens, *Berk.* in Hook. Journ. Bot. 1845, p. 59.

S. spiniferum, Lloyd, Letter No. 51, p. 4.

S. Archeri, Berk. in Hook. Flor. Tasm. ii. p. 259.

South Australia. National Park, Adelaide.

Distrib. Tasmania, New Zealand.

"*S. spiniferum*" is the young form of this species, with pileus shortly reflexed, and bright hymenium contracting sharply with the whitish margin. When old, the colour becomes duller and the margin less differentiated. The type of *S. Archeri* is a very old specimen of this species. It appears to be common in Australia, and is easily recognised by the brown, strigose pileus and pinkish-lilac hymenium. Aculeate paraphyses, similar to those of *S. frustulosum,* Fr., are present between the basidia. Figure by Lloyd (loc. cit.)

S. rugosum, *Fr.* Epicr. p. 552.

South Australia. Tanunda.

Distrib. Europe, North America.

S. sanguinolentum, *Fr.* Epicr. p. 549.

New Zealand. Domain Park, Auckland.

Distrib. Europe, North America.

S. rhabarbarinum, *Wakefield,* comb. nov.

Corticium rhabarbarinum, Berk. et Br. in Journ. Linn. Soc. xiv. 1873, p. 69, p.p.; non *C. rhabarbarinum,* Berk. in Hook. Flor. Nov. Zel. ii. p. 184 (= *Hymenochaete rhabarbarina,* Cooke in Grevillea, viii. p. 148).

New South Wales. Nowra.

Distrib. Ceylon.

The type material of "*C. rhabarbarinum,* Berk. et Br.," from Ceylon, consists of two species, namely, this and another which is identical with "*C. reticulatum,* Berk. et Br.," a doubtful *Corticium.* The present species is not a *Hymenochaete,* but a

Stereum, allied to *S. frustulosum*, Fr. The name *Hymenochaete rhabarbarina*, Mass. Journ. Linn. Soc. xxvii. p. 113, is to be deleted, as it refers partly to this species and partly to *H. rhabarbarina*, Cooke.

Entirely resupinate, but sometimes with a thick, upturned margin, hard and rigid. Hymenium cinnamon, cracked into numerous small areas, in habit closely resembling *Hymenochaete unicolor*, Berk. & Curt. (=*H. spreta*, Peck), but differing in the absence of brown setae. Between the basidia are numerous aculeate paraphyses, 15–20 × 5 μ, blunt, cylindrical. Hyphae 2–5 μ in diameter, irregularly branched, septate, scarcely distinguishable, and closely united to form a firm tissue. Sub-hymenial hyphae coloured brown, basal hyphae hyaline or pale yellowish, but brown here and there in patches. Spores not seen.

Peniophora setigera, (*Fr.*) *Bres.* in Bourdot & Galzin, Bull. Soc. Myc. Fr. xxviii. 1912, p. 399.
South Australia. National Park, Adelaide.
Distrib. Europe, North America.

P. cinerea (*Fr.*) *Cooke* in Grevillea, viii. 1879, p. 20.
New Zealand. Mamaku, near Rotorua.
Distrib. Europe, North America.

P. velutina (*DC.*) *Cooke* in Grevillea, viii. 1879, p. 21.
New Zealand. Wairoa, near Rotorua.
Distrib. Europe, North America.

P. radicata (*P. Henn.*) *v. Höhnel et Litsch.* Beiträge zur Kenntnis der Corticeen, ii. 1907, p. 8.
Victoria. Ballarat.
Distrib. Europe, Tropical Africa.

P. pubera, (*Fr.*) *Sacc.* Syll. vi. 1888, p. 646.
New South Wales. Katoomba, Blue Mountains.
Distrib. Europe.

P. Cheesmanii, *Wakefield*, sp. nov.
Fungus late effusus, arcte adnatus, ceraceus, ochroleucus, 0·5–0·75 mm. crassus, ambitu similari, interdum leviter reflexo. *Hymenium* laeve, sub lente cystidiis pruinosum. *Cystidia* numerosa, fusiformia, apice fortiter incrustata, 50 × 8–15 μ, plerumque obducta. *Basidia* clavata, 4-sterigmatica, 6–7 μ diametro. *Sporae* laeves, ellipticae, hyalinae, 5·5 6 × 4–4·5 μ. *Hyphae* basales 2·5–4 μ diametro, flavidae, hyphae contextus stramineae, 2–3·5 μ.
Hab. On bark, Moruya, New South Wales.
Somewhat resembling *P. Molleriana*, Bres. in habit, but differing in the pale brownish subiculum and in the spores.

P. vermicularis, *Wakefield*, sp. nov.
Fungus effusus, albido-griseus, tenuissimus, sub lente cystidiis hispidulus; subiculum fere nullum. *Cystidia* subulata, laevia, sed apice incrustata, crasse apice excepto tunicata, basi bifurcata, 45–70 × 8–14 μ. *Basidia* non visa. *Sporae* fusiformes, utrinque acutae, arcuatae vel flexuoso-vermiculiformes, 9–11 × 2–3 μ. *Hyphae* indistinctae, 1 μ diametro.

Hab. On a fern petiole, Whakarewarewa, near Rotorua, New Zealand.

Very close to *P. vermifera*, Bourdot, in the peculiar spores, but differing especially in the smaller size of the spores and cystidia. The walls of the cystidia are acted on by potassium hydrate solutions in the same way as those of *P. glebulosa*, Bres., to which the present species is also allied.

Corticium confluens, *Fr.* Epicr. p. 564, *sensu Bres.*
Victoria. State Nursery, Creswick, near Ballarat.
Distrib. Europe.

C. luteo-aurantiacum, *Wakefield*, sp. nov.

Fungus effusus, tenuis, ceraceus. *Hymenium* sulphurinum vel ochraceo-aurantiacum, laeve; subiculum ambitusque albida. *Basidia* clavata, 4-sterigmatica, 30–40 × 6–7 μ. Adsunt quoque *cystidiola* numerosa, subulata, apice acuta, granulis aurantiacis incrustata, alia obducta, alia usque ad 36 μ emergentia, 45–50 × 4·5 μ. *Sporae* oblongae, hyalinae, 5 × 2·5–3 μ, uniguttulatae. *Hyphae* basales hyalinae, granulis luteis leviter incrustatae, valde ramosae, septatae, 3–5 μ diametro.

Hab. On wood, Mamaku, near Rotorua, New Zealand.

A beautiful and conspicuous species with its bright yellow colour varying to tawny orange. In the possession of slender crystidioles, it is allied to *C. ochraceo-flavum*, Bourd. & Galz.; but it differs in the more brilliant colouring and softer (less horny) consistency when dry. The colouring matter is soluble in alkalies, forming a bright yellow solution.

Asterostroma persimile, *Wakefield*, sp. nov.

Fungus late effusus, tenuis, fragilissimus, margine indeterminato; subiculum spongioso-molle, fulvum. *Hymenium* avellaneum, pulverulentum. *Setae* stellatae brunneae, 30–140 μ latae, 3–5 radiatae, radiis 15–75 μ longis, basi 2–7·5 μ crassis. *Gloeocystidia* fusiformia vel ventricosa, apice acuta, 60–100 × 9–12 μ. *Basidia* clavata, 4-sterigmatica, 25–32 × 7 μ. *Sporae* subglobosae, stellato-tuberculosae, hyalinae, 7·5–10 × 6·8 μ. *Hyphae* hyalinae, tenuiter tunicatae, septatae, 2–2·5 μ diametro.

Hab. On wood, Rotorua, New Zealand.

Exactly resembling in appearance *A. cervicolor*, to which species this plant was at first referred. It is also close to *A. cervicolor* in the general type of structure; but differs in the spores, which are angular, with large conical warts like those of *Inocybe asterospora*, instead of being globose with small spines. The stellate hyphae are also somewhat coarser. It might perhaps be regarded as a variety (geographical?) of *A. cervicolor*.

Asterostromella rhodospora, *Wakefield*, sp. nov.

Fungus irregulariter effusus, crassus, subdurus, ochroleucus, margine determinato, concolore vel fulvo. *Hymenium* ob sporis leviter salmoni-tinctum, pulverulentum. *Contextus* ex hyphis tenuissimis, dendroideo-ramosis compositus, superiores hyalinae, basales pallide fulvae. *Gloeocystidia* anguste fusiformia, straminea, non vel vix emergentia, 30–90 × 6–8 μ. *Basidia* clavata,

maturitate emergentia, mox collapsa, 2–4-sterigmatica, 5 μ diametro. *Sporae* subglobosae, verruculosae, roseo-stramineae, 6–6·5 μ.

Hab. On wood, Nambour, Blackall Range, Queensland.

The spores are very abundant and salmon-coloured in the mass, giving a faint salmon tint to the hymenium, which is otherwise pale buff (Ridgway 17′ f, approximately) and very smooth.

Solenia candida, *Pers.* Disp. Meth. Fung. p. 36.

South Australia. Mt. Lofty, Adelaide.

Distrib. Europe, Ceylon, New Zealand, North America.

Spores hyaline, subglobose, 4–5 μ in diameter.

TREMELLACEAE.

Hirneola polytricha (*Mont.*) *Fr.* Fung. Nat. p. 146.

New Zealand. Mamaku, near Rotorua.

Distrib. Cosmopolitan in tropical and subtropical regions.

Tremella mesenterica, *Retz.* in Vet. Akad. Handl. 1769, p. 249.

New Zealand. Rotorua.

Distrib. Europe, North America.

Guepinia spathularia, *Fr.* Elench. ii. p. 32.

New Zealand. Mamaku, near Rotorua.

Distrib. Cosmopolitan in warm climates.

Heterochaete Cheesmanii, *Wakefield*, sp. nov.

Fungus primo orbicularis, deinde effusus, tenuis, membranaceus, secedens, margine interdum leviter reflexo. *Hymenium* pallidum, aculeis minutis, teneris, sparsis, concoloris. *Contextus* fulvus, mollis. *Basidia* elliptica, demum cruciatim 4-septata, 15×10–12 μ, sterigmata 4, 13–30×2 μ. *Sporae* cylindricae, curvatae, 14–15×5–5·5 μ. *Hyphae* basales luteae, 1·5–4 μ, septatae, hinc inde septato-nodosae.

Hab. On wood, Moruya, New South Wales.

Approaching *H. europaea*, v. Höhnel, in the measurement of spores and basidia, but differing in texture and colour.

GASTEROMYCETACEAE.

Clathrus gracilis, *Schlecht.* in Linnaea, xxxi. 1861, p. 166.

New South Wales. Moruya.

Distrib. Only known from Australia.

Crucibulum vulgare, *Tul.* in Ann. sci. nat., sér. 3, i. 1844, p. 90.

New Zealand. Ohinemutu, near Rotorua.

Distrib. Europe, Australia, North America.

Nidula microcarpa, *Peck* in White, Bull. Torr. Bot. Club. xxix. 1902, p. 272.

New Zealand. Mamaku, near Rotorua.

Distrib. North America.

Geaster australis, *Berk.* (?), in Hook. Flor. Tasm. ii. p. 265.
New South Wales. Moruya.
Distrib. Tasmania.
Very close to *G. saccatus*, but differing principally in the larger spores, which are finely warted and 5–8 μ in diameter.

Lycoperdon pusillum, *Fr.* Syst. Myc. iii. p 33.
New South Wales. Moruya.
New Zealand. Mamaku, near Rotorua.
Distrib. Europe, North America.

Pilacre Petersii, *Berk. et Curt.* in Ann. Nat. Hist., 3 ser., iii. 1859, p. 362.
New South Wales. Moruya.
Distrib. Europe, North America.
Named by Miss G. Lister to whom it was sent amongst the Mycetozoa of the collection.

UREDINACEAE.

Uromycladium Robinsoni, *McAlpine* in Ann. Myc. iii. 1905, p. 306.
New Zealand. Rotorua. On phyllodes of *Acacia* sp.
Distrib. Australia.

SPHAERIACEAE.

Eutypella stellulata (*Fr.*) *Sacc.* Syll. i. p. 149.
Queensland. Nambour, Blackall Range.
New Zealand. Rotorua.
Distrib. Europe, North America, South America.

Rosellinia aquila (*Fr.*) *De Not.* in Comm. Soc. Critt. It., No. 4, 1863, p. 227.
Western Australia. Perth.
New Zealand. Mamaku, near Rotorua.
Distrib. Europe, North America.

R. radiciperda, *Mass.* in Kew Bull. 1896, p. 1.
New Zealand. Rotorua.
Distrib. Only known from New Zealand.

Xylaria apiculata, *Cooke* in Grevillea, viii. 1879, p. 66.
Queensland. Brisbane.
Distrib. New Zealand, Brazil (Theissen).

X. castorea, *Berk.* in Hook. Flor. Nov. Zel. ii. p. 204.
New Zealand. Rotorua.
Distrib. Only known from New Zealand.
Spores elliptical, 10×5–$5{\cdot}5$ μ.

Poronia punctata, *Fr.* Summ. Veg. Scand. p. 382.
New South Wales. Katoomba, Blue Mountains.
Distrib. Europe, Tasmania, South Africa, South America.

Hypoxylon coccineum, *Bull.* Champ. Fr. p. 174.
New South Wales. Moruya.

New Zealand. Mamaku, near Rotorua.
Distrib. Probably cosmopolitan.
The specimens show young stromata together with the conidial stage, *Isaria umbrina*, Pers.

Daldinia concentrica, *Ces. et De Not.* in Comm. Soc. Critt. It., No. 4, 1863, p. 198.
Queensland. Nambour, Blackall Range.
New Zealand. Rotorua.
Distrib. Cosmopolitan.

Melanomma plagia, *Cooke et Mass.* in Grevillea, xvii., 1888, p. 8.
New Zealand. Mamaku, near Rotorua.
Distrib. Australia.

DISCOMYCETES.

Urnula rhytidia (*Berk.*) *Cooke*, Handbook of Australian Fungi, p. 269. For synonyms and re-description, see Massee, Journ. Linn. Soc. xxxi. 1896, p. 502, and Petch, Ann. Roy. Bot. Gard. Peradeniya, Vol. iv. p. 422.
Western Australia. Perth.
New Zealand. Mamaku, near Rotorua.
Distrib. India, Ceylon (as *Rhizina reticulata*, B. et Br.).

Lachnea coprinaria (*Cooke*) *Phil.* Brit. Discom. p. 224.
Queensland. Nambour, Blackall Range.
Distrib. Europe, North America.

L. coprogena, *Berk. et Br.* in Trans. Linn. Soc. ser. ii., vol. 2, 1883, p. 495. Re-description by Massee in Journ. Linn. Soc. xxxi. 1896, p. 495.
New South Wales. University Grounds, Sydney.
Distrib. Recorded only from Australia.

Orbilia xanthostigma, *Fr.* Summ. Veg. Scand. p. 357.
Victoria. Melbourne.
Distrib. Europe.

DEUTEROMYCETES.

Rhinotrichum pulchrum, *Berk.* in Journ. Linn. Soc. xiii. 1873, p. 175.
South Australia. National Park, Adelaide.
Distrib. Only known from Australia.
Conidia yellowish, elliptical or lemon-shaped, smooth, 15-20 × 12-15 μ. Hyphae hyaline or pale yellowish, 7-8 μ in diameter.

Volutella ciliata, *Fr.* Syst. Myc. iii. p. 467.
New South Wales. Katoomba, Blue Mountains.
Distrib. Europe, South America.

PHYCOMYCETES.

Phycomyces nitens, *Kze.* Mykol. Hefte, ii. 1823, p. 113.
New South Wales. Moruya. On a greasy wooden box.
Distrib. Europe, New Zealand, North America.

EXPLANATION OF PLATES.

All figures × about 650.

PLATE I.

Fig. 1. *Peniophora vermicularis*, n. sp. *a* Cystidium. *b* Spores.
Fig. 2. *Asterostroma persimile*, n. sp. *a* Portion of hymenium. *b* Spores. *c* Gloeocystidium. *d* Brown stellate hypha from tissue.
Fig. 3. *Asterostromella rhodospora*, n. sp. *a* Section through hymenium. *b* Spores. *c* Gloeocystidium. *d* Branched hypha from tissue.
Fig. 4. *Heterochaete Cheesmanii*, n. sp. *a* Two basidia of different ages. *b* Spores, one of which is germinating.

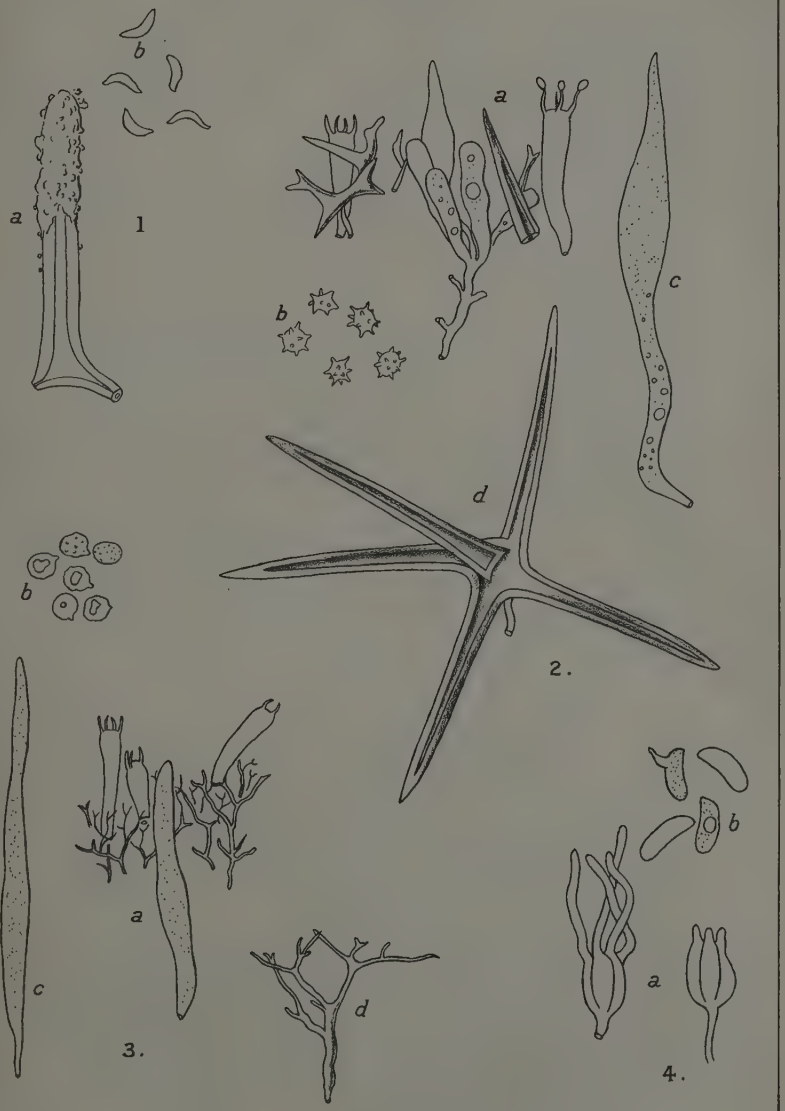
PLATE II.

Fig. 5. *Corticium luteo-aurantiacum* n. sp. *a* Section of hymenium, showing basidia and cystidioles. *b* Spores.
Fig. 6. *Peniophora Cheesmanii*, n. sp. *a* Section of hymenium. *b* Spores.
Fig. 7. *Hymenochaete tasmanica*, Mass. *a* Section of hymenium. *b* One of the branched hyphae. *c* Seta.
Fig. 8. *Hymenochaete fuliginosa*, sensu Berk. *a* Section of hymenium. *b* Seta.
Fig. 9. *Stereum rhabarbarinum*, comb. nov. Section of hymenium.

XXXVI.—DAWYCK.

W. J. BEAN.

This estate is situated in Tweeddale, a few miles from Peebles, amid romantic scenery, and varies in elevation from 500 to 2600 feet. Mr. F. R. S. Balfour, an enthusiastic arboriculturist and forester, who has travelled widely, especially in the great forest regions of Western North America, has introduced here a number of new and rare species. Dawyck as a garden and tree-planting centre has quite an interesting history. It belonged in ancient times to "a very considerable family of the name of Veitch." By 1715 it had come into the possession of Sir James Nasmyth who remade the garden and rebuilt the house so that, as we are told by Loudon, "from being a lonely mansion in the bosom of a gloomy mountain, it is now the extreme reverse." Two hundred years ago mountain scenery appears to have aroused emotions in the human mind very different to those we experience to-day. Traversing Mr. Balfour's plantations of larch and pine and fir on a bright day in May, the scene engirdled by the rounded hills of Tweeddale, one's feelings, even in these times, could scarcely be described as gloomy. Apart from its forestry, Dawyck is, indeed, a beautiful garden set in beautiful surroundings. The stonework near the house especially, so apt in old gardens to be redundant and obtrusive, is admirable in its restraint and in relation to its environment. Immediately behind the house are two large rectangular lawns on different levels and enclosed by low walls. Old Irish yews stand sentinel along the upper side. Beyond



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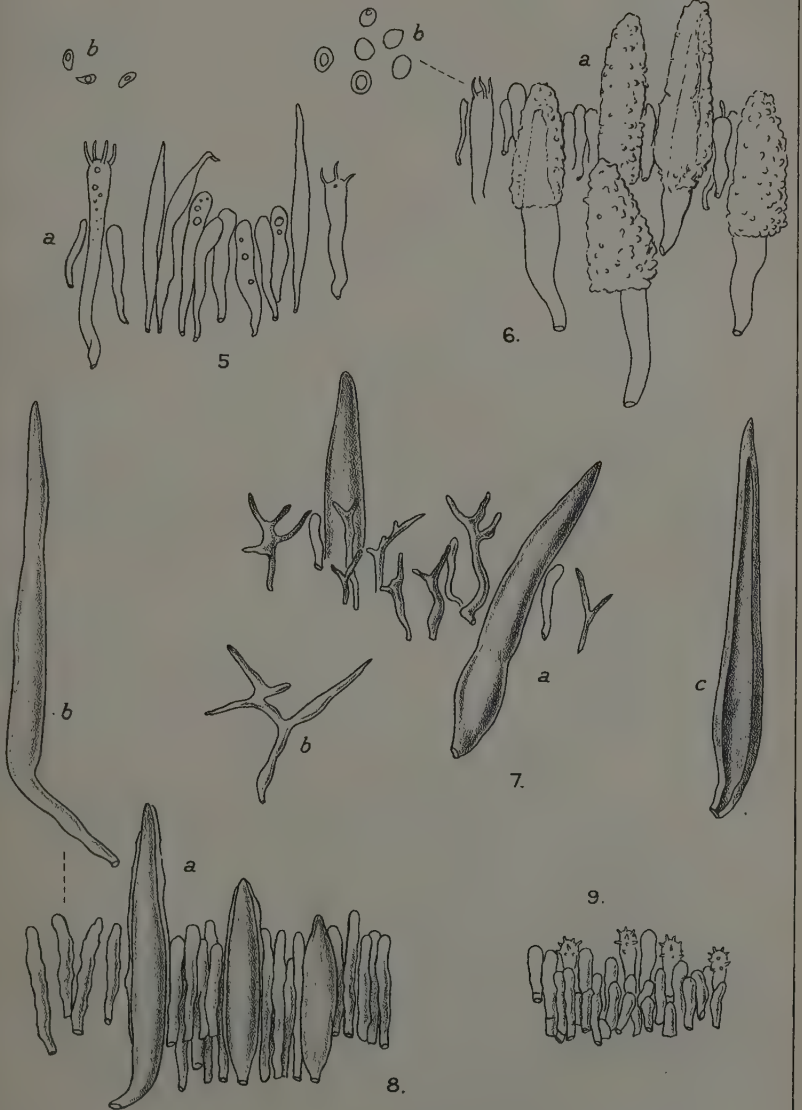

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the walls the grounds commence to rise rapidly, except where a steep-sided glen penetrates the hill—a small burn at its base hurrying to join the Tweed. Here, about sixty years or so ago, many trees were planted which have now become magnificent specimens.

There are some very fine examples of Douglas fir, and there is a perfect *Picea orientalis* with a trunk 5 ft. 9 in. in girth. *Tsuga Albertiana* (*Mertensiana*) also is a picture of health and grace. Of *Abies pectinata* there are the remains of an old avenue, the trunks of the individual trees measuring nearly 15 ft. in girth. There are also several notable specimens of *Abies nobilis*, *A. magnifica*, and *A. Nordmanniana*. Of the last the tallest is a very perfectly shaped tree growing near the "Sargent" garden which was 92 ft. high when measured a few years ago, and is now considerably taller. In some respects the most remarkable tree at Dawyck is a beech with erect-growing branches, now known as the "Dawyck Beech." It is at present the only fastigiate tree of common beech of which there is common knowledge, except some young ones raised from it. Over fifty years ago Petzold called a beech var. *pyramidalis*, but this appears to have been lost sight of. In any case Mr. Balfour's tree is truly fastigiate rather than pyramidal. It was named *Fagus sylvatica* var. *fastigiata* in *Gardeners' Chronicle*, March 9th, 1907, p. 149.

Although by name the balsam poplar (*Populus balsamifera*) is one of the best known of trees, the actual tree to which the name truly belongs is rarely to be found. Its place in gardens has been usurped by a closely allied poplar (*P. candicans*), distinguished by its pubescent young shoots. The real balsam poplar is a fine tree at Dawyck, where in May it filled the air around with the balsamic odour of its leaves and young shoots. Of common trees the most striking and numerous are the beeches, oaks—both pedunculate and sessile—and sycamores. The last especially, with rugged lichen-covered trunks, are very picturesque. Besides all these, Mr. Balfour has got together an extensive collection of exotic trees and shrubs of a newer generation. Of *Picea Breweriana*, that remarkable and beautiful weeping spruce from the Siskiyou Mountains of California, he has the best stock in Europe, and there are growing here many other rare trees and shrubs that he himself has imported from Western America, such as *Pachystima Myrsinites*, *Rhododendron albiflorum* (which has recently flowered at Dawyck), the yellow-fruited *Sambucus pubens*, *Cassiope Mertensiana*, the American form of *Linnaea borealis*, *etc.*

It appears to be an undecided question whether the first larches planted in Scotland were at Dawyck or at Dunkeld and Monzie. It is, however, claimed for Dawyck, on the authority of Sir Thomas Dick Lauder, that the first Scottish larches were planted there in 1725, whilst those at Dunkeld and Monzie were not planted until 1738. Of the nine original Dawyck larches, five still remain—rugged and battered veterans, but still in health. One of these figured by Loudon is among the survivors.

Many years ago someone at Dawyck planted large numbers of *Pinus Cembra*, a pine which has rarely been planted in any quantity. Many of the trees have been blown down in storms, but those that remain must, taken as a whole, be amongst the largest in the kingdom. One finely proportioned tree over 50 ft. high has a trunk girthing 5 ft. This pine appears to have little to recommend it for planting under forestry conditions in this country.

The lime avenues radiating north and east of the house were planted about 200 years ago and are still intact; but of the horse chestnuts of an even earlier date, few are left. The two mentioned by J. Walker in "Essays on Natural History," as being, when he wrote in 1812, 150 years old, and the first planted in Scotland, still remain, though a good deal decayed. Sir Walter Scott used to visit Dawyck and take pleasure in sitting under these trees.

Mr. Balfour is doing valuable work in covering the mountain sides of his estate up to 1000 and 1200 ft. with plantations of forest trees. Besides great stretches of common larch he has, for instance, sixty acres of Japanese larch (*Larix leptolepis*) and a large area of Douglas fir. But the most interesting part of his planting is where he is leaving the beaten track. He has, for example, a plantation of *Pinus monticola*, a comparatively rare and uncommon pine in this country and the West American representative of the Weymouth pine (*P. Strobus*). It is thriving extremely well, and Mr. Balfour thinks highly of it. Neither rabbits nor roe deer interfere with it, and its timber is known to be good. Extensive plantings of the new *Larix occidentalis* are also being made. There are some very thriving plantations of the Sitka Spruce (*Picea sitchensis*), and here as elsewhere in Scotland it promises to be one of the best of American trees. The Lawson and Nootka cypresses are succeeding well, but of *Thuya plicata* (syns. *Lobii* and *gigantea*), thousands have been destroyed in a young state by a parasitic fungus. Of broad-leaved species, Mr. Balfour is planting *Populus trichocarpa*, *Betula occidentalis* and *Alnus incana*, which grow very rapidly at Dawyck and give promise of becoming large trees.

In an admirably arranged and managed nursery of forest trees, Mr. Balfour has great numbers of the young conifers—mostly of *Abies* and *Picea*—introduced by Wilson during his last journey in the mountains of Western China. Sites on the hill-sides are already fixed on for these trees, and it is certain that their growth will be noted with the keenest interest by foresters throughout the country. In spite of the great number of timber-producing trees that have been introduced to this country from abroad, very few have proved to possess real economic value under forest conditions. Any one who can find a single species that will do for British forestry what the common larch, for instance, has done, will lay his country under a heavy debt of gratitude. Experimental planting, such as is being carried on by Mr. Balfour, is therefore a work of national importance.

XXXVII.—CEANOTHUS RIGIDUS.

T. A. Sprague.

Ceanothus rigidus was collected by Nuttall near Monterey, California, and his manuscript description was published in Torrey and Gray, Flora of North America, p. 268 (1838). It runs as follows: "Young branches pubescent; leaves opposite and crowded, cuneate-obovate, mostly retuse, thick and coriaceous, mucronately crenate-toothed, glabrous above, somewhat canescent beneath; umbels axillary and terminal, few-flowered, sessile; pedicels at length elongated; ovary with three protuberances. Bushy woods near Monterey, California.—March.—A shrub about 6 ft. high, rigid, intricately branched, almost spinose. Leaves about half an inch long, sometimes nearly obcordate; teeth conspicuous; the veins, &c., as in *C. verrucosus*. Clusters of flowers composed of several small crowded umbels; the pedicels gradually elongating to the length of 3–4 lines. Calyx and corolla bright blue."

C. rigidus was first introduced to cultivation in this country by Hartweg in 1848, though it had been collected by David Douglas and Thomas Coulter as far back as 1830–1833. Hartweg found it in open places in woods near Monterey in February, 1847,* and described it as an evergreen shrub, 4 ft. high, with azure flowers.† An amended description, based on plants grown in the Horticultural Society's garden, was published in 1850.‡

"A stiff branching dark evergreen bush; said to grow 4 ft. high when wild. Young branches downy. Leaves small, truncate, spiny-toothed, subsessile, very shining and smooth on the upper side; on the under pale and netted. This network is produced by numerous short branching veins, in the interspaces between which are deep pits, reaching half through the parenchyma, and each closed up by a dense ring of white converging hairs. Such pits are placed pretty generally in a double row between each of the principal lateral veins. The flowers appear in small clusters or umbels at the end of very short spurs. They are deep purplish violet, not blue, and less showy than those of *C. dentatus* or *C. papillosus*."

In 1852 *C. rigidus* was figured in the Botanical Magazine (t. 4664) from plants received from the Horticultural Society. The flowers were described as a rich purple-blue in colour.

The herbarium specimens of *C. rigidus* gathered by Hartweg, and the plants raised from seed collected by him and described in the Journal of the Horticultural Society and Botanical Magazine agree with Nuttall's type. The Botanical Magazine plant has rather more toothed leaves, but this is a very variable character,

* Journ. Hort. Soc. vol. iii. p. 218: "Two species of *Ceanothus*, the one producing numerous bundles of blue flowers from the axils of its small evergreen leaves.

† Benth. Pl. Hartweg. p. 302; and label in Herb. Kew.

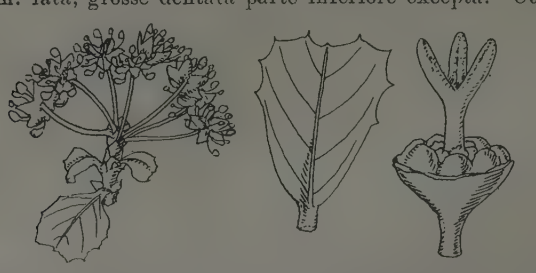
‡ Journ. Hort. Soc. vol. v. p. 197.

considerable differences being found among the leaves on the same shoot.

Typical *C. rigidus* has small obovate-cuneate or suborbicular leaves, toothed in the upper half, small inflorescences with much abbreviated rhachis and short pedicels, and deep purple-blue flowers. It is now rare in cultivation in this country,* having been replaced by a form which may be known for horticultural purposes as var. *pallens*, though its botanical value is but slight. This has longer, more strictly cuneate, more conspicuously toothed leaves, larger inflorescences with longer rhachis and pedicels, and paler flowers. It appears to have been introduced for Messrs. Veitch by William Lobb, who collected in California during the period 1849–57. It is represented by two sheets in the Hookerian Herbarium, one marked "Hort. Veitch e California," the other "366 California, Lobb, 1857."

Ceanothus rigidus, var. **pallens,** *Sprague;* foliis longioribus, cuneatis, rhachi pedicellisque longioribus, floribus pallidioribus a typo recedit.

Folia cuneata, subtruncata vel emarginata, 0·8–2·5 cm. longa, 0·5–1 cm. lata, grosse dentata parte inferiore excepta. *Corymbi*



8–12-flori, ramulos abbreviatos bifoliatos terminantes; rhachis 6–7 mm. longa; pedicelli 1–1·5 cm. longi. *Flores* pallide violaceo-lilacini. *Calyx* 5–6 mm. diametro; lobi 2 mm. longi. *Corolla* 8 mm. diametro; petala 3 mm. longa. *Filamenta* 3–3·5 mm. longa. *Discus* sordide rubellus. *Stylus* in toto 2·5 mm. longus, ad medium trifidus; rami apice vix incrassati.

Though it may be convenient to distinguish the above form from the type, as it appears to be common in cultivation, it

* Specimens have been received from Miss E. Willmott, V.M.H., Warley Place.

nevertheless represents only one of a series of forms, which hardly admit of independent recognition, though the extremes are readily separable. *Brandegee* No. 93, from Monterey has leaves like those of var. *pallens*, but shorter pedicels, and *Elmer* No. 3535, from the same locality, resembles typical *C. rigidus*, but has almost entire leaves. Trelease* considers the plant figured in Bot. Mag. t. 4660 as a form of *C. rigidus*, and this form bridges over the gap between typical *rigidus* and var. *grandifolius*, which has a very distinct facies.

The illustration of *C. rigidus* given by Lindley and Paxton† resembles var. *pallens* rather than the type, which suggests that there may have been a considerable amount of variation in the plants of *C. rigidus* raised by the Horticultural Society from Hartweg's seed. T. A. S.

XXXVIII.—IBURU AND FUNDI, TWO CEREALS OF UPPER GUINEA.

(*Digitaria Iburua; D. exilis.*)

O. Stapf.

Iburu. In Dudgeon's "The Agricultural and Forest Products of British West Africa" (1911), p. 149, a cereal, called "Iboru," is mentioned as being grown in Northern Nigeria in the fields along with millet. It is also quoted in the Report on the Agricultural Department for 1912, Northern Nigeria, as a "cereal" (a small millet) receiving "a great deal of attention" at Zaria. No description is given nor is it referred to a definite species or genus of grasses. Quite recently, however, specimens of Iburu were received from Mr. Lamb with a note that the grass was sown in rows as a field crop in the Hausa States. The specimens had been obtained at Zaria, and were numbered 54. The grass belongs to the genus *Digitaria*, and resembles *D. exilis*, Stapf (*Paspalum exile*, Kippist) another small grained cereal of West Africa. Its botanical affinity is, however, with *D. ternata*, Stapf (*Panicum ternatum*, *Hochst.*), from which it can easily be distinguished by its crowded, closely imbricate spikelets, which are at the same time quite glabrous and slightly larger. From *D. exilis* it differs likewise in the packed arrangement of the spikelets and also in the angular, scabrid (not terete, smooth and disk-tipped) pedicels, and the short, very delicate upper glume. The grains of Iburu separate fairly readily from the surrounding husks when pressure is applied, and those of the sample received are pure white. They weigh in their husks on the average 0·7 mgr., so that over 40,000 go to one ounce. As one raceme may contain as many as 200 spikelets, a single head may yield between 1,000 and 2,000 grains.

As the grass has not been described so far, a full technical description is given herewith.

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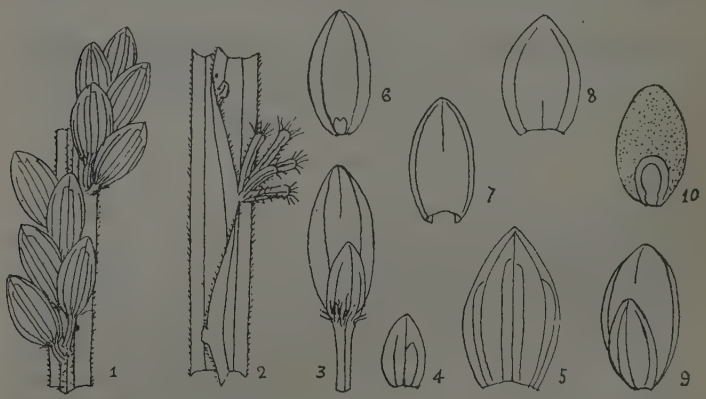
* A. Gray, Syn. Fl. N. Am. vol. i. part 1, p. 417.

† Paxton's Flower Garden, vol. i. p. 74, fig. 51.

Digitaria Iburua, *Stapf* [Gramineae-Paniceae]; affinis *D. ternatae*, Stapf, sed spiculis majoribus glaberrimis densissime imbricatis distincta. A *D. exili*, Stapf, simili differt spiculis multo arctius aggregatis, pedicellis angulatis scaberulis apice haud in discum dilatatis, gluma superiore tenuiore multo breviore.

Annual, over 0·5 m. high. *Culms* glabrous, erect, simple, with 4–5 nodes; internodes enclosed in the sheaths, excepting the uppermost. *Leaf* sheaths tight, striate, glabrous, smooth, the lower keeled upwards; ligules membranous, rounded, broad, 2–3 mm. long; blades linear, rather broad at the base, long and finely attenuated upwards, up to 30 cm. long and 1 cm. wide, flat, with some long hairs near the base from behind the ligule, mid-rib slender, prominent above, primary side nerves about six on each side. *Racemes* subcomposite, 4–10, digitate, the lowest



D. Iburua. Fig. 1, part of raceme × 6; 2, part of rhachis spikelets removed × 8; 3, spikelet; 4, upper glume; 5, lower valve; 6, upper valve with valvule of lower floret in front; 7, upper valve, back view (the middle nerve is thinning out towards the base; it, as well as the side nerves are much less marked than shown in the drawing); 8, valvule; 9, fruiting spikelet; 10, seed. Figs. 3–10 × 10.

usually somewhat distant (1–2 cm.) from the remaining, which are closely crowded, suberect, 12–13 cm. long, slender, dense, pale green; rhachis triquetrous, slightly over 1 mm. wide, white, rounded and smooth on the back, angles green, narrowly winged scaberulous; branchlets finely filiform, adpressed to the rhachis, up to 5 mm. long, about 4 mm. distant, bearing up to five spikelets from near the base, angular, scaberulous, with short hairs or almost glabrous; pedicels similar, the lower very short, the upper up to 2·5 mm. long, tips minutely bearded, slightly thickened. *Spikelets* tightly imbricate, elliptic-lanceolate, subacute at the base, acute at the tips, 2 mm. long, pale green, quite glabrous, flat on the abaxial face. *Glumes* very delicate, hyaline, the lower quite minute or suppressed, the upper

ovate, obtuse, 0·75–1 mm. long, delicately three-nerved. *Valve* of lower (barren) floret thin, membranous, as long as the spikelet, sub-seven-nerved, the three inner nerves parallel, approximate and prominent, the lateral in pairs at the flexures, the outermost usually finer and shorter, the accompanying valvule almost microscopic, broad, emarginate-truncate; valve of upper (fertile) floret thinly papery, as long as that of the lower, smooth, obscurely nerved, embracing the very similar valvule with wide margins. *Stamens* 3; anthers 1 mm. long. *Stigmas* shortly exserted from near the apex. *Grain* ellipsoid, slightly compressed from the back, 1·5–1·75 mm. long, white, very finely pitted, tightly enclosed by the somewhat indurated brown husks; scutellum broad-elliptic, not quite reaching to the middle of the grain.

Nigeria. Hausa States, sown in rows as a field crop, Zarìa, *Lamb* 54.

Fundi. This has for some time been known as a cultivated cereal in West Africa. It was first observed by Afzelius, who collected it in Sierra Leone in 1798, and on the label accompanying his specimen in the Smithian Herbarium at the Linnean Society observed that it was "much cultivated there by the negroes"; but he did not name it, and the plant remained unnoticed until in 1842 specimens were brought to this country by Mr. Robert Clarke, senior assistant surgeon to the Colony of Sierra Leone. From those Kippist described the grass as *Paspalum exile* in the Proceedings of the Linnean Society, vol. I. p. 157. Clarke's account of the cultivation and uses of the grass is interesting enough to be reprinted here in full.

"This Lilliputian grain, which is described by Mr. Clarke as being about the size of mignonette-seed, is stated to be cultivated in the village of Kissy and in the neighbourhood of Waterloo by industrious individuals of the Soosoo, Foulah, Bassa and Joloff nations, by whom it is called "hungry rice." The ground is cleared for its reception by burning down the copse-wood and hoeing between the roots and stumps. It is sown in the mouths of May and June, the ground being slightly opened, and again lightly drawn together over the seed with a hoe. In August, when it shoots up, it is carefully weeded. It ripens in September, growing to the height of about 18 in., and its stems, which are very slender, are then bent to the earth by the mere weight of the grain. They are reaped with hooked knives. The patch of land is then either suffered to lie fallow, or planted with yams or cassava in rotation. Manure is said to be unnecessary or even injurious, the plant delighting in light soils and being raised even in rocky situations, which are most frequent in and about Kissy. When cut down it is tied up in small sheaves and placed in a dry situation within the hut, for if allowed to remain on the ground or to become wet the grains become agglutinated to their coverings. The grain is trodden out with the feet, and is then parched or dried in the sun to allow of the more easy removal of the chaff in the process of pounding, which is performed in

wooden mortars. It is afterwards winnowed with a kind of cane fanner on mats.

In preparing this delicious grain for food, Mr. Clarke states that it is first thrown into boiling water, in which it is assiduously stirred for a few minutes. The water is then poured off and the natives add to it palm oil, butter or milk; but the Europeans and negroes connected with the colony stew it with fowl, fish or mutton, adding a small piece of salt pork for the sake of flavour, and the dish thus prepared is stated to resemble kous-kous. The grain is also made into a pudding with the usual condiments, and eaten either hot or cold with milk; the Scotch residents sometimes dressing it as milk-porridge. Mr. Clarke is of opinion that if the fundi grain were raised for exportation to Europe, it might prove a valuable addition to the list of light farinaceous articles of diet in use among the delicate or convalescent."

Subsequently it was noticed by Dr. A. Chevalier in "Une Mission au Senegal" (1900), 241. He identified it with *Paspalum longiflorum*, Retz, and gave "Fonio" as the native (Bambara) name. According to him it is cultivated almost all over the French Sudan, in Upper Gambia, Upper Casamance and Fouta-Djallon. The yield is small, but the taste so pleasant that even Europeans relish it. Pobéguin (Essai s.l. Flore de la Guinée Française, 1906, p. 215) also records it as cultivated all over French Guinea, and on the label of a specimen collected near Kouroussa (Upper Niger) he even calls it the principal food of the natives. Dr. Kersting observed it in cultivation in Togoland. In 1904 Kew received specimens of it from the late Mr. W. R. Elliot from Northern Nigeria, with a note to the effect that the plant was cultivated at Loko, Nassarawa, and the seeds "eaten made into porridge." The native name given was "Acha." In 1911 it was sent in by Mr. C. C. Yates from the Niger Province, and last year by Mr. P. H. Lamb from Zaria, with the statement that "Acha" was sown broadcast as a field crop in the Hausa States. He has since informed us that it is even more largely cultivated by the Pagan tribes who inhabit the Bauchi Plateau at an altitude of 4000 ft., where the soil is, for the most part, poor and sandy.

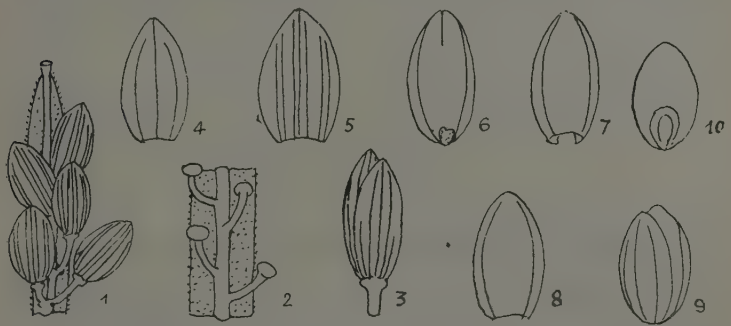
D. exilis approaches *D. longiflora*, Pers., very closely, and differs from it mainly in the perfectly glabrous and somewhat more turgid spikelets which, when mature, weigh on the average 0·53 mgr. (53,000 grains to the ounce). Well-developed racemes may contain up to and even over 200 spikelets, and there are usually 2–4 racemes to the head, so that one head may yield some 600 grains, which is well below the yield of Iburu. The very much more general use of Fundi, as compared with Iburu, suggests some advantages in favour of the former which are, however, not apparent from the meagre material at hand. The close resemblance between *D. exilis* and *D. longiflora* points to *D. longiflora* as the ancestral wild form of *D. exilis*, but more extended investigation is necessary before this hypothesis can be accepted as proved. *D. longiflora* is widely distributed throughout the tropics of the Old World, but is apparently rare in Upper

Guinea. *D. exilis*, on the other hand, is only known in the cultivated state from the area indicated above.

The following is a description of "Fundi."

Digitaria exilis, *Stapf.*

Annual, over 0·5 m. high. *Culms* glabrous, erect or geniculate-ascending, simple or sparingly branched from below, with 5–8 nodes, nodes constricted, mostly shortly exserted from the sheaths, uppermost internode long exserted. *Leaf* sheaths tight, or the lower and intermediate somewhat loose and slipping off the internodes, striate, glabrous, smooth, the lower more or less keeled; ligules membranous, rounded, broad, up to 2 mm. long; blades linear, gradually attenuated to an acute point, 0·5–1·5 cm. by 3–7 mm.; flat, glabrous, midrib slender, primary side nerves 3–4 on each side. Racemes 2–4, digitate, sessile or subsessile, or



D. exilis. Fig. 1, part of raceme × 6; 2, part of rhachis, spikelets removed × 8; 3, spikelet; 4, upper glume; 5, lower valve; 6, upper valve with valvule of lower floret in front (the middle nerve should have been shown thinning out towards the base); 7, upper valve, back view (the side nerves are too much emphasized, and the middle nerve is omitted); 8, valvule; 9, fruiting spikelet; 10, seed. Figs. 3–10 × 10.

the terminal shortly peduncled, 5–12 (rarely 14) cm. long, slender, pale green in flower; rhachis flat, 0·5 to almost 1 mm. wide, green, margins scabrid, midrib rather stout, whitish, very slightly convex and smooth on the back, more or less raised, rounded and almost smooth, or very sparingly and minutely pubescent on the face; pedicels paired or (upwards always) solitary or, towards the base, approximate in groups of 3 or 4, flexuous, terete, with the tips discoid, from less than 0·5 to 1 mm. long, whitish, smooth, or sometimes very sparingly and minutely asperulous or pubescent. *Spikelets* subimbricate when in flower, elliptic-oblong in outline, acute, 1·75–2 mm. long, pale green, quite glabrous, flat on the abaxial face. *Glumes* very different; the lower delicately hyaline, nerveless, very minute or almost suppressed, the upper broad-oblong, obtuse or subobtuse, hyaline between the 3–5 percurrent green nerves, slightly shorter than the spikelet. *Valve* of lower (barren) floret elliptic, subobtuse, as long as the spikelet, thin, hyaline between the seven raised percurrent green nerves, which are parallel and equally distant, or more often the three

inner and the two outer on each side slightly more approximate, usually all connected by transverse bars close below the hyaline tips; accompanying valvule almost microscopic, square, papillose; valve of upper (fertile) floret thinly papery, equalling the spikelet, acute, embracing the very similar valvule almost entirely, shining, faintly 5–nerved. *Stamens* 3. *Stigmas* dark purple, shortly exserted from near the tip of the spikelet. *Grain* oblong-ellipsoid, slightly flattened on the back, 1 mm. long, white, smooth and shining, tightly enclosed by the slightly indurated brown husks; scutellum ovate-elliptic, not quite reaching to the middle of the grain. *Digitaria longiflora*, Mission au Senegal, 241, non Retz. *Paspalum exile*, Kippist in Proceed. Linn. Soc. i. 157, 16.

Sierra Leone. Without precise locality, *Afzelius*, *R. Clarke*, *Schön.*

French Guinea. San, *Chevalier* 2217; Koroussou, *Pobéguin* 490.

Togoland. Difalu, *Kersting.*

Nigeria. Nassarawa, *Elliot* 195; Zaria, *Lamb* 53; Niger Province, *Yates* 29.

XXXIX.—DIAGNOSES AFRICANAE: LXIV.

1551. **Passerina Galpini,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 10, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *P. filiformi*, Linn., foliis subcylindricis, bracteis transverse oblongis calyceque glabro differt.

Rami breves, glabri. *Folia* conferta, subcylindrica, leviter incurvata, 6 mm. longa, 1 mm. diametro, glabra, nitida. *Flores* ad ramorum apices aggregati; bracteae transverse oblongae, 5 mm. latae, scariosae, basi intus lanatae, apice in lobum crassum subulatum obtusum 2 mm. longum producto; bracteolae 0. *Calyx* glaber; tubus anguste ovoideus, 3 mm. longus, 1 mm. diametro parte inferiore; lobi 3 mm. longi, 2 mm. lati, ovati, concavi, obtusi. *Stamina* longiora 3 mm. longa; antherae obtuse cordatae, 1 mm. longae. *Ovarium* oblongum, glabrum; stylus calycis tubo paullo longior; stigma penicillatum.

South Africa. Riversdale Div.; Milkfontein, 183 m., *Galpin* 4491.

1552. **Passerina laniflora,** *C. H. Wright* in Dyer, Fl. Cap. vol. 5, sect. 2, p. 11, anglice [Thymelaeaceae-Euthymelaeeae]; *P. paleaceae*, Wikstr., calyce lanato differt.

Planta lignosa; rami plures, breves, apice pilosi. *Folia* stricte quadrifaria, oblonga, paullo incurvata, obtusa, glabra, 4 mm. longa, 0·5 mm. lata. *Flores* ad ramorum apices aggregati; bracteae ovatae, 3 mm. longae; bracteolae 2, crasse triquetrae, 3 mm. longae. *Calyx* dense lanatus; tubus subcylindricus,

3 mm. longus; lobi 4, late ovati, obtusi, 3 mm. longi, 2 mm. lati. *Filamenta* tenuia, longiora 1·5 mm. longa; appendices cylindricae, 0·5 mm. longae. *Ovarium* ovoideum; stylus filiformis, 4 mm. longus; stigma penicillatum.

South Africa. Clanwilliam Div.; Cederberg Range, Sneeuw Kop, 1376 m., *Bodkin in Herb. Bolus.* 9086.

1553. **Passerina rubra,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 12, anglice [Thymelaeaceae-Euthymelaeeae]; *P. ericoidei*, Linn., affinis, foliis internodiis brevioribus spicisque elongatis differt.

Rami virgati, graciles, primum pubescentes, demum glabri; internodia foliis paullo longiora. *Folia* oblonga, triquetra, obtusa, glabra, 3 mm. longa, 0·7 mm. lata. *Flores* prope ramorum apices congesti; bracteae ovatae, intus dense sericeae, extus crasse 5–vel 7–costatae; bracteolae 0. *Calycis* tubus ovoideus, 3 mm. longus; lobi elliptici, concavi, obtusi, subscariosi, 2·7 mm. longi, 1·3 mm. lati. *Stamina* 8, longiora 3 mm. longa. *Ovarium* ovoideum, glabrum; stylus filiformis; stigma penicillatum.

South Africa. Riversdale Div.; Muiskraal, near Garcias Pass, 370 m., *Galpin* 4492; Albany Div.; mountains near Howison's Poort, 611 m., *MacOwan* 103.

1554. **Cryptadenia laxa,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 17, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *C. uniflorae*, Meisn., foliis ovato-lanceolatis ramisque primum puberulis differt.

Planta 30 cm. alta vel brevior, basi ramosa; rami graciles, rigidi, primum puberuli, demum glabri; internodia foliis aequilonga. *Folia* opposita, ovato-lanceolata, acuta, 8 mm. longa, usque ad 2 mm. lata, concava, dorso levia vel supra leviter carinata, glabra. *Flores* solitarii, terminales. *Calyx* extus sericeus; tubus cylindricus, tenuis, 4-6 mm. longus; lobi ovati, 6 mm. longi, 2·5 mm. lati, subacuti. *Stamina* longiora ad medium loborum calycis attingentia; antherae oblongae, 1 mm. longae; laciniae ad basin filamentorum liberorum oblongae, tenues, 0·5 mm. longae. *Ovarium* oblongum, glabrum; stylus lateralis, filiformis, supra incrassatus pilosusque; stigma breviter clavatum.

South Africa. Caledon Div.; Zwart Berg, near Caledon, 978 m., *Bolus* 7875; near Houw Hoek, 611 m., *Bolus* 9208; Bredasdorp Div.; Elim, *Bolus* 7876; and without precise locality, *Harvey*.

1555. **Struthiola epacridioides,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 29 [Thymelaeaceae-Euthymelaeeae]; affinis *S. ovatae*, Thunb., foliis patentibus floribusque in axillis fere foliorum omnium dispositis differt.

Rami longi, primum pilosi, demum glabri. *Folia* patentia, lanceolata, plana, acuminata, 1·2 cm. longa, 3 mm. lata, marginibus ciliatis. *Flores* axillares; bracteolae fere 4 mm. longae,

subulatae, leviter recurvatae, ciliatae. *Calycis* tubus subrectus, glaber, 1·4 cm. longus, 0·7 mm. diametro; lobi ovati, obtusi, 2 mm. longi, 1·5 mm. lati. *Petala* 8, 1·5 mm. longa, pilis aequilongis circumdatis instructa. *Ovarium* oblongum, glabrum; stylus filiformis; stigma penicillatum.

South Africa. Without precise locality, *Mund* 19.

In *S. ovata*, Thunb., the flowers are confined to the axils of the upper leaves; in *S. epacridioides* they are situated in the axils of nearly all the leaves of the branches, thus giving the two plants quite different facies.

1556. **Struthiola Macowani,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 29 [Thymelaeaceae-Euthymelaeeae]; affinis *S. ovatae*, Thunb., foliis ellipticis angustioribus calyceque longiore differt.

Caulis erectus, subrobustus, sparse ramosus; rami primum leviter pubescentes. *Folia* opposita, imbricata, elliptica, acuta, minute scaberula, 0·8–1 cm. longa, 3 mm. lata. *Flores* in axillis foliorum plurium dispositi; bracteolae oblongae, obtusae, ciliatae, 4 mm. longae. *Calyx* glaber; tubus subcylindricus, leviter curvatus, 1·6 cm. longus; lobi subrotundati, obtusi, 2 mm. longi. *Petala* 8, oblonga, crassa 1·2 mm. longa, pilis aequilongis circumdatis instructa. *Antherae* connectivo obtuso supra producto instructae. *Ovarium* oblongum, glabrum; stylus filiformis, 1·2 cm. longus; stigma penicillatum.

South Africa. Humansdorp Div.; Kruisfontein Mountains, 275 m., *Galpin* 4505, Albany Div.; near Grahamstown, *MacOwan* 14; Howisons Poort, *Schönland*.

1557. **Struthiola pondoensis,** *Gilg* ex *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 31, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *S. hirsutae*, Wikstr., foliis ovato-lanceolatis subtus glabris differt.

Caulis ramosus; rami primum pilosi, deinde glabrescentes, demum cicatricibus foliorum delapsorum scabri. *Folia* ovato-lanceolata, acuta, basi leviter contracta, subtus glabra, marginibus ciliatis, 8 mm. longa, 3 mm. lata. *Flores* in axillis foliorum superiorum dispositi; bracteolae 2, lanceolatae, concavae, dense ciliatae, 3 mm. longae, 1 mm. latae. *Calyx* glaber; tubus cylindricus, gracilis, 9 mm. longus; lobi deltoidei, acuti, 2 mm. longi, 1·5 mm. lati. *Petala* 8, calycis lobis dimidio breviora, crassa, pilis paullo brevioribus circumdata. *Antherae* oblongae, obtusae, 1·5 mm. longae. *Ovarium* oblongum, compressum, glabrum; stylus filiformis; stigma penicillatum.

South Africa. Pondoland; without precise locality, *Bachmann* 719.

1558. **Struthiola congesta,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 31, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *S. hirsutae*, Wikstr., foliis omnino glabris minutissime denticulatis differt.

Frutex multiramosum; rami subgraciles, demum cicatricibus foliorum delapsorum scabri. *Folia* elliptica, obtusa vel subacuta,

glabra, minutissime denticulata, 8 mm. longa, 2 mm. lata. *Flores* in axillis foliorum supremorum dispositi; bracteolae 2·5 mm. longae, induplicatae, marginibus latis membranaceis ciliatis et fasciculo terminali pilorum instructae. *Calyx* glaber; tubus 8 mm. longus, 0·7 mm. diametro; lobi ovati, obtusi, 2·5 mm. longi, 2 mm. lati. *Petala* 8, crassa, 1 mm. longa, pilis paucis dimidio brevioribus circumdata. *Antherae* connectivo brevi truncato fusco coronatae. *Ovarium* oblongum, glabrum; stylus filiformis, 6 mm. longus; stigma penicillatum.

South Africa. Pondoland; in a damp valley near Murchison, *Wood* 3030.

1559. **Struthiola cicatricosa,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 32, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *S. linearilobae*, Meisn., ramis primum pilosis, foliis fasciculo terminali pilorum instructis differt.

Fruticulus erectus, multiramosus; rami graciles, primum pilosi, demum cicatricibus foliorum delapsorum scabri. *Folia* opposita, subulata, acuta, fasciculo terminali pilorum instructa, 6 mm. longa, 0·5 mm. lata. *Flores* in axillis foliorum superiorum dispositi; bracteolae 4 mm. longae, oblongae, ciliatae, fasciculo terminali pilorum instructae. *Calyx* glaber; tubus gracilis, glaber, 1·4 cm. longus; lobi oblongi, acuti, apice penicillati, 3 mm. longi, 0·7 mm. lati. *Petala* 8, oblonga, 1 mm. longa, pilis aequilongis circumdata. *Antherae* connectivo acuto terminatae. *Ovarium* oblongum, glabrum; stylus filiformis; stigma parvum.

South Africa. Without precise locality, *Thom* 577.

1560. **Struthiola longifolia,** *C. H. Wright* in Dyer, Fl. Cap. vol. v. sect. 2, p. 33, anglice [Thymelaeaceae-Euthymelaeeae]; affinis *S. erectae*, Linn., foliis oblongis duplo longioribus differt.

Rami erecti, virgati, quadrangulares, glabri, cicatricibus prominentibus foliorum delapsorum vestiti. *Folia* oblonga, acuta, glabra, 1·2–1·4 cm. longa, 1 mm. lata. *Flores* in axillis foliorum plurium dispositi; bracteolae oblongae, obtusae, carinatae, glabrae, 5 mm. longae, marginibus membranaceis. *Calyx* glaber; tubus parte inferiore cylindricus, parte superiore inflatus, 1·2 cm. longus; lobi ovati, acuti, apice incrassati, 3 mm. longi, 2 mm. lati. *Petala* 8. *Antherae* connectivo acuto coronatae. *Ovarium* oblongum; stylus filiformis, 1 cm. longus; stigma penicillatum.

South Africa. Caledon Div.; Zoetemelks Valley, *Burchell* 7578.

XL.—MISCELLANEOUS NOTES.

David Thomas Gwynne-Vaughan.—After some weeks of illness, Professor D. T. Gwynne-Vaughan died at Reading on September 4th. His death is deeply regretted by his numerous friends and botanical associates, and to many of them it was entirely unexpected.

Gwynne-Vaughan had held the Professorship of Botany at University College, Reading, for just a year since leaving Belfast, where he was Professor of Botany at Queen's University. Before his appointment to Belfast a few years ago, he was Lecturer in Botany at the Birkbeck College, and before that in the University of Glasgow, where he was on the Botanical Staff from 1897 to 1907.

Some of his earliest research work was carried out at Kew in the Jodrell Laboratory, and led to the publication in 1896 and 1897 of papers on the morphology and anatomy of the *Nymphaeaceae*, and on "Polystely in the Genus *Primula*." In both cases vascular anatomy was specially dealt with, and the direction of his later work was thus indicated, his energies being afterwards chiefly devoted to a study of the vascular anatomy of Ferns. While still working at Kew he was attracted by this subject, and since then his interest in Ferns and Vascular Cryptogams in general has never flagged.

The result of his investigations is seen in a number of important contributions, *e.g.*, those on the anatomy of *Loxsoma* and of other Ferns with solenostelic structure, and a series of papers published in collaboration with Mr. R. Kidston, F.R.S., on Fossil *Osmundaceae*. These, like the rest of Gwynne-Vaughan's published works, are the outcome of careful observation and keen judgment, and their value is widely known as having contributed a large part of the advance made in recent years in our knowledge of the vascular tissues of Ferns.

Gwynne-Vaughan naturally took a great interest in the collection of Ferns at Kew, so that for him a tour of the Fern Houses formed an essential part of a visit to the Gardens, and he regretted that his visits to Kew were perforce rather rare.

Frederick W. Harvey.—We regret to record the death of Mr. F. W. Harvey, a former member of the gardening staff of the Royal Botanic Gardens, and for the last five years Editor of *The Garden*. He came to Kew in April, 1903, from the Essex County Council Gardens at Chelmsford, and after undergoing the general routine of a young gardener's life here, left in July, 1905, to take up a position on the Editorial Staff of *The Gardener*. In 1907 he was appointed Sub-Editor of *The Garden* and became Editor of that Journal in 1910. In the latter position he was responsible for the horticultural matter in *Country Life*, and added to the Country Life Library a book on *Fruit Growing for Beginners*, and a new and enlarged edition of *Gardening for Beginners*. He took an active interest in various horticultural matters and was a prominent member of various horticultural societies. He was also a member of the Executive Committee of the Kew Guild, and always keenly interested himself in all matters concerning the welfare of the Guild. Until the middle of August he appeared to be in normal health; after a few days' illness, however, circumstances arose which necessitated a serious operation and he died a week later on August 31st.

Cistanche lutea.—Reference was made to Tournefort's Phelipae Lusitanica, flore luteo (*Cistanche luteo*, Hoffnigg. and Link), in the article "The Genus Phelipaea," *K.B.* No. 6, p. 286, and it was stated that "a drawing and a carbon impression of it marked 'D. Tourn. e Portugalia D. Sherard' is in Morison's Herbarium, and that a description was published by Bobart in Morison's Plantarum Historia, vol. iii. (1699), p. 502." To this was added the remark "whether Tournefort had it from Grisley, or collected it himself when in Portugal in 1688, as is most likely, is uncertain." Professor Henriques, of Coimbra, has since been so kind as to call our attention to his paper "Exploraçao Botanica em Portugal par Tournefort" (in Bol. Soc. Brot. vol. viii. pp. 191–261), which contains an enumeration by Tournefort of the plants he collected in Portugal in 1689. From the list it is evident that Tournefort collected this *Cistanche* between Villa Nova de Portimâo and Lagos in the Province of Algarve in 1689. The entry (p. 221) runs "Orobanche palustris maximo digitalis flore luteo. Orobanche elegantissima verna flore luteo Grisley." On p. 257, Prof. Henriques identifies this plant with "Phelypaea Lusit. flore luteo, Corol. 47—P. lusitanica, Tournef." Tournefort travelled twice in the Iberian Peninsula, and it was during his second journey that he visited Portugal. He started in October, 1688, but did not reach Portugal until the following year.

O. S.

Botanical Magazine for September.—The plants figured are *Populus lasiocarpa*, Oliver (t. 8625); *Gladiolus Melleri*, Baker (t. 8626); *Ornithoboea Lacei*, Craib (t. 8627) and *Metrosideros diffusa*, Smith (t. 8628).

The Poplar is without doubt the finest species of the genus with its leaves measuring as much as 14 inches long by 9 inches wide, and having midrib, veins and petiole a rich red. Like its closest ally *P. glauca*, Haines, the flowers are polygamous, and the catkins are from 4–6 inches in length. *P. lasiocarpa* was first collected by Mr. A. Henry in Hupeh, and was introduced to cultivation by Messrs. Veitch & Sons, who received a living plant from Mr. E. H. Wilson. The specimens figured came from the gardens of Mr. F. C. Stern and Sir Harry Veitch, where the tree flowered in 1914.

Gladiolus Melleri was discovered in 1861 by Mr. C. J. Meller in Nyasaland during Dr. Livingstone's Zambesi expedition. The plant figured was sent to Kew in 1913 by Mr. A. Hislop from Rusape, Rhodesia. Its nearest ally, *G. Buchanani*, Baker, also from Nyasaland, differs especially in having several well-developed leaves instead of the single elongated leaf characteristic of *G. Melleri*, and in *G. Melleri* the stamens are shorter than the upper perianth segments.

The genus *Ornithoboea* now contains at least six species, all natives of the Indo-Chinese region. Three of these have now flowered under cultivation, the one under notice having been raised at Kew from seed collected by Mr. J. H. Lace in Upper

Burma, the other two being from seeds sent by Dr. Kerr from Siam to Trinity College, Dublin. *Ornithoboea* resembles *Boea* and *Streptocarpus* in its twisted fruits, but it is distinguished from both by its bilabiate corolla with the short upper lip.

Metrosideros diffusa, a native of New Zealand, is a very striking species with its crimson flowers and conspicuous stamens. Its nearest ally is *M. albiflora*, Sol. from which it is easily distinguished by its much smaller leaves and crimson flowers. *M. diffusa* is confined to the North Island and was introduced to cultivation by Captain A. A. Dorrien Smith. It flowered for the first time in the gardens at Tresco Abbey, Isles of Scilly, in April, 1914.

W. H. Fitch.—The publication named below was accidentally omitted from the "Serials and Periodicals" (*see* p. 284) containing drawings by W. H. Fitch. Adding these to the approximate number of published plates of his work brings the total up to 9960.

Refugium Botanicum (W. W. Saunders), 5 vols., 1869–1880. Three hundred and sixty partly coloured plates.

W. B. H.

Dominica Botanic Gardens.—We regret to learn, through a letter from Mr. J. Jones, the Curator, that the Island of Dominica was visited by a very heavy gale on the night of August 10th, which caused a great deal of damage in the Botanic Gardens and also in other places. About 100 trees, some of large size, were uprooted, and many others lost their tops or some portion of their branches. Unfortunately a number of species of which there was only a single specimen have been destroyed.

Mr. Jones writes that it will be a long time before the grounds can be put in proper order; but a generation at least must elapse before the gardens can be fully restored to their condition before the gale. The photographs accompanying the letter are sad records of the devastation which has been caused.

Mr. Jones adds that the cacao and lime experiment plots, which lie in situations better protected than the Botanic Gardens, are not seriously damaged, although there is some loss of trees. Some of the lime estates in the Island exposed to the south-west have, however, suffered severely. Not only has there been a great loss of crop, but a large number of trees have been uprooted.